

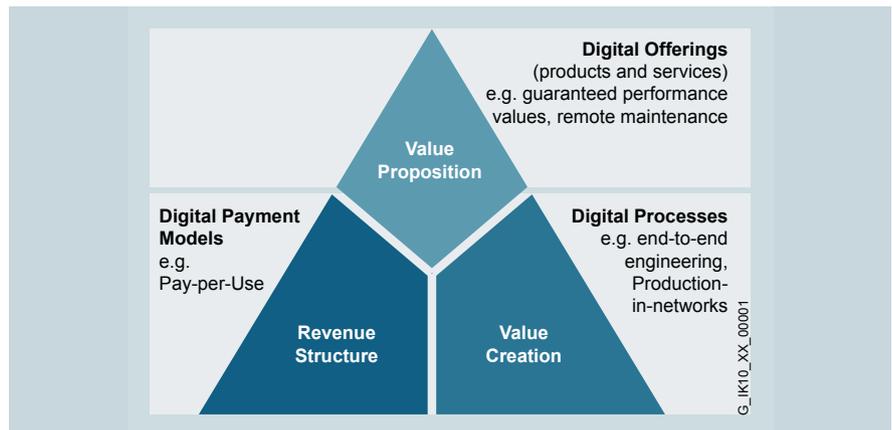
SIEMENS

Technical article

The Chicken or the Egg?

Industrial Communication as the Basis for new digital Business Models

What came first – the Chicken or the Egg? When it comes to the digitalization of industry, a similar question arises with regard to new digital business models – is a business vision needed to start with, or are the technological innovations required first? A recipe for success can be the building of a digital infrastructure and a step-by-step, experimental strategy development.



Digital business models can be realized in three ways.

When talking about digitalization, the technological perspective is often focused on: How can a connectivity between the field level and the cloud be established, which aspects must be considered for the virtualization, what is needed for a comprehensive security concept, and much more. All of these topics are important, but a different question takes center stage when it comes to digitalization: How can companies achieve a strategic competitive advantage through digital concepts? It is about nothing less than a digital business model to be able to succeed against global competition.

Starting Points for digital Business Models

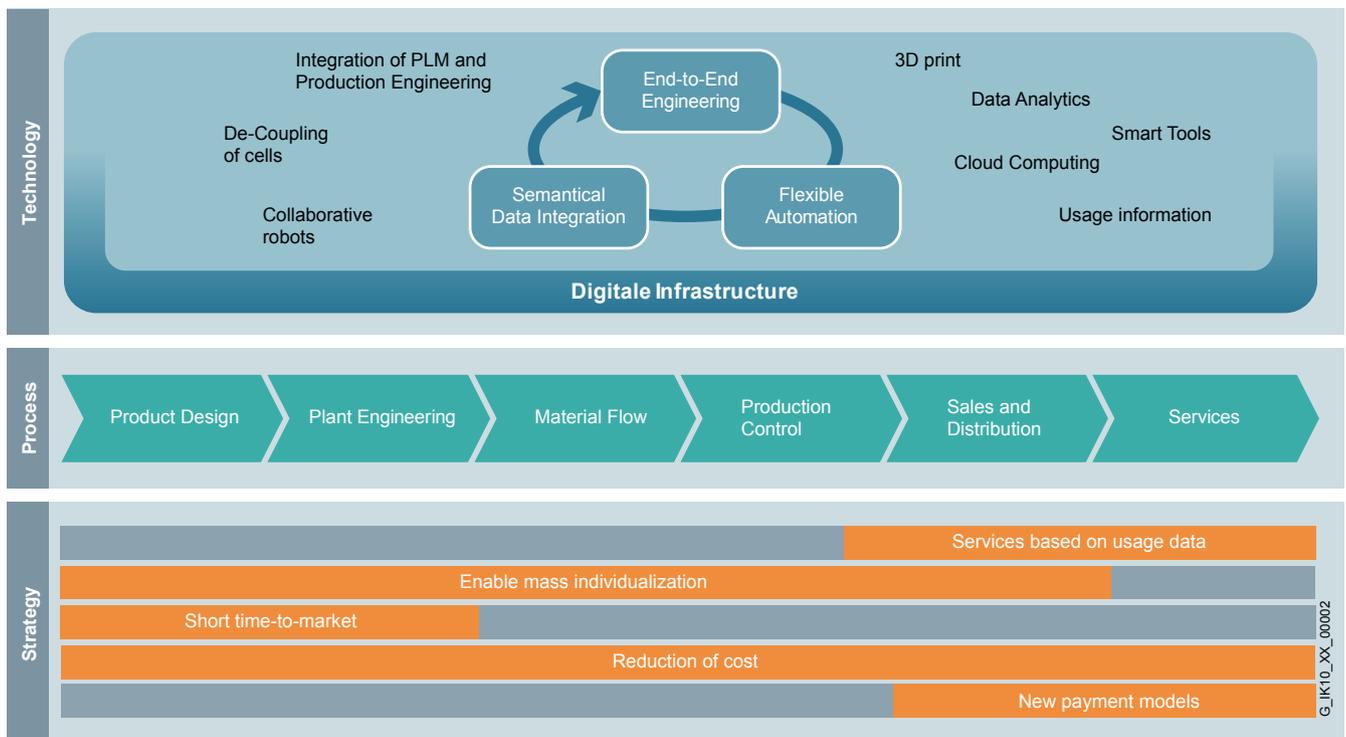
Three possible starting points are available for the development of a digital business model. For instance, the actual product can be digitalized first. Although industrial products are rarely as easy to substitute digitally as the vinyl record by CDs and MP3 downloads, a digital customer benefit can also be created by means of appropriate services, which, for example, take over the monitoring of specific installations at the customer (remote maintenance). Tied to that can be performance and availability guarantees by the manufacturer. The benefit for the customer: The customer does not buy a machine with a performance promise, but instead pays for the actual performance and quality.

A second option is the digitalization of one's own service provision, i.e., the introduction of digital technologies to improve one's own processes and methods. Industrie 4.0 especially focuses on this option. Besides lowering throughput times and thus costs as well as increasing the achievable quality, from a strategic perspective it is above all the ability to control complex product offerings in a customer-specific mass production. As a result, manufacturers are able to meet the ever more demanding customer requirements in a more targeted way than with a conventional organization of development, production and logistics.

The third option is covered by the introduction of new payment models, which go far beyond just machinery and equipment sales. First of all, the necessary investment costs (CAPEX – capital expenditures) can be converted in favor of use-oriented costs (OPEX – operational expenditures). This makes it easier for the customer to try out new concepts, because the manufacturer can be tied more strongly – also financially – to the achievable results of the investment. Payments can also be based on actual availabilities. Through a continuous remote monitoring of machinery and equipment, the manufacturer can ensure in a timely manner that its performance promise is fulfilled; its own risk becomes controllable through the use of appropriate technologies.

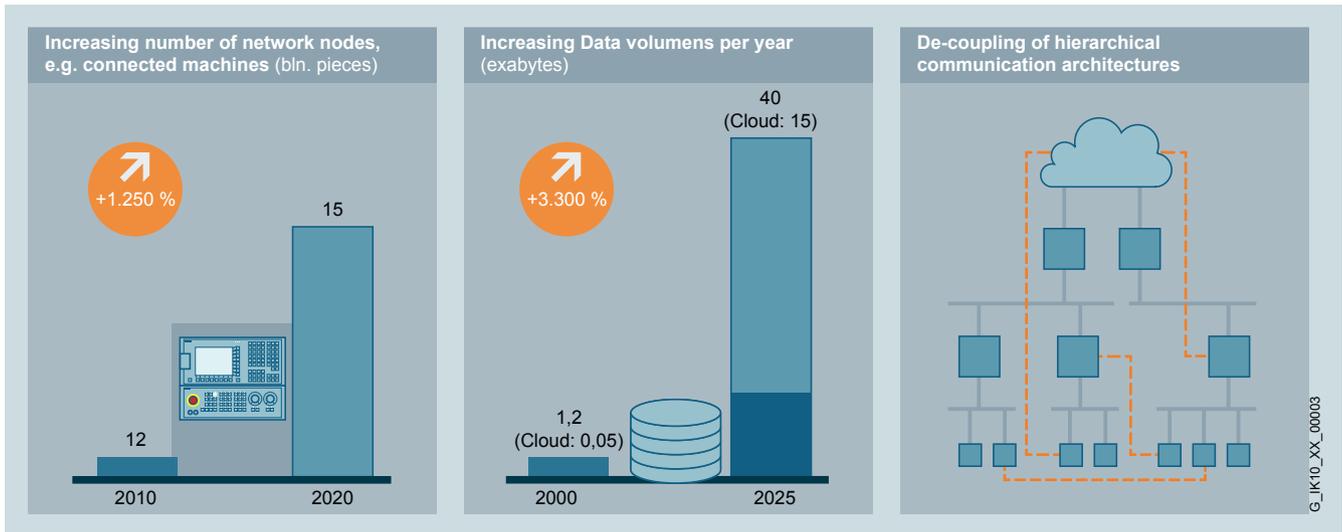
Technological Innovations as the Basis

All of these business innovations, though, are based on technological innovations ranging from end-to-end engineering to 3D printing and collaborative robotics to new, data-driven service offerings – which are also discussed at length in the context of Industrie 4.0. All of these technologies can lead to spectacular results for some companies, while other firms are unable to discover the right benefits for themselves and their customers. The processes and strategies that can be derived from them, too, are only possibilities that companies can implement in various combinations.



Digital technologies enable new business strategies across the entire value chain (according to Weinländer: Industrielle Kommunikation: Basistechnologie für die Digitalisierung der Industrie. Beuth: Berlin, Germany, 2017).

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Requirements for communication networks due to digitalization (according to Weinländer: Industrielle Kommunikation: Basistechnologie für die Digitalisierung der Industrie. Beuth: Berlin, Germany, 2017).

However, since there can be no automatism and no recipe for success, an agile approach is recommended in practice. On the one hand, the technological possibilities are reflected and explored against the background of one's own company and its strengths and weaknesses. The objective is to develop a clear picture of how technological innovations can be put to good use. On the other hand, small, defined experiments with innovations should also take place in the marketplace, e.g., by initially testing a new offering with a number of partners before a broad market roll-out. Business model simulations are possible as well, e.g., in order to test the actual effects of a pay-per-use model in collaboration with pilot customers.

Applying to almost all digital approaches is the necessity for a powerful infrastructure to make the implementation in the company possible. Digital processes essentially mean the exchange of data between all possible partners; for all of these information flows, powerful, reliable, flexible and secure communication networks are required. In addition, there is a need for a scalable software platform, which enables the corresponding processing capabilities through algorithms and apps. Such a platform can be MindSphere from Siemens, which functions as an operating system in the "Internet of Things (IoT)". The establishment and expansion of the digital infrastructure is therefore a third possibility for a company to prepare for the digitalization.

Communication Networks as digital Infrastructure

The basis for this digital infrastructure is the industrial communication network. It must satisfy the most diverse requirements. First of all, today's applications must continue to run undisturbed, especially in the production, i.e., the automation requirements regarding bandwidth, availability and special needs such as real-time communication continue to apply without restrictions. In addition, the network must be open and flexible so that it is also suitable for future digital applications or at least can be expanded accordingly. For these reasons, providers such as Siemens supply a broad portfolio of network components that meet a wide range of requirements, e.g., via modularized devices.

Digitalization can affect three aspects of the network architecture: Firstly, significantly more participants enter the network; secondly, the data volume increases considerably; and thirdly, new communication relationships will evolve, which will less and less correspond to today's hierarchical design. Studies are expecting about 15 billion networked machines by 2020; the annual data volume is estimated to be 40 exabytes. Nevertheless, the overall networking cost is a critical factor to keep in mind.

For a network reference architecture, three guiding principles can be formulated from that: Segmentation, increasing aggregation and security-in-depth. Segmentation means that not all communication end nodes must be grouped together in a flat network. Instead, individual communication cells are formed resulting in significantly fewer participants to manage per segment.

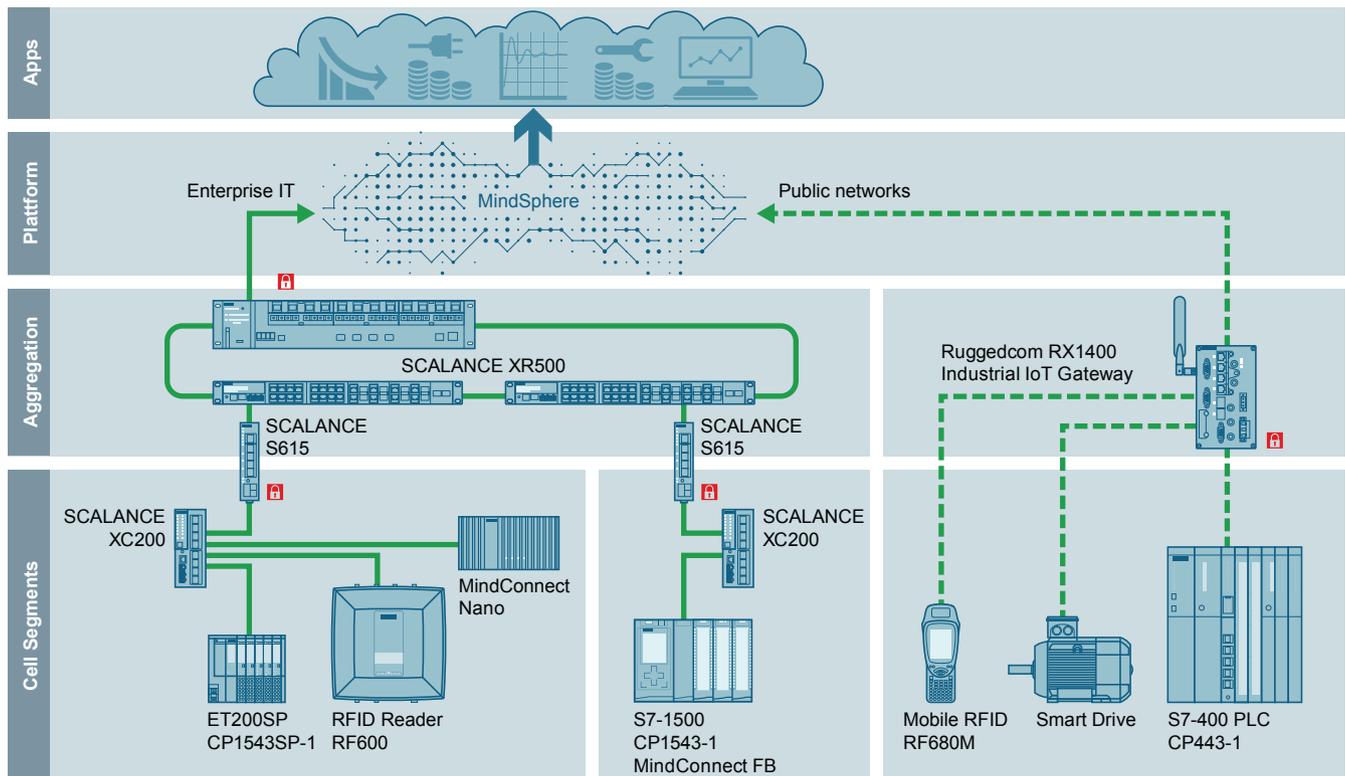
Further segments can be integrated as necessary. The increasing aggregation across vertical levels gradually adds additional bandwidth for higher performance as well as further redundancy mechanisms for improving overall network reliability. Finally, Siemens' multi-level security-in-depth concept ensures that attacks are reliably averted and network availability is maintained.

An important alternative can be the use of public mobile communications networks, which realize cloud and IoT connections without connecting to the automation network, e.g., when it comes to connecting special, additional sensors or the goods acquisition by RFID at the supplier or logistics partner. Here, for example, the industrial IoT gateway Ruggedcom RX1400 from Siemens can be employed, which on the one hand provides a variety of interfaces (including WLAN) at the field level, and on the other hand enables an aggregation of data prior to the transmission into the cloud by means of its own processing logic.

Use for new Business Strategies

How can such an architecture be utilized for business strategies? The sky is the limit when it comes to the possibilities; especially for medium-sized providers, there are interesting opportunities. For instance, the shower tray manufacturer Bette has established a made-to-order business model based on RFID and digital networking, and can now much better meet the needs of customers and architects (cf. Ermer/Weinländer: International Marketing. Publicis: Erlangen, Germany, 2017). Würth Industrie Service, a provider of C-parts for the industry, has also expanded its business model with industrial communication technology – its RFID-supported e-Kanban system turns the company from purely a supplier into a system partner for its customers (cf. Hoppe, Schorndorfer: From C-parts supplier to innovative process service provider thanks to RFID. In: Weinländer: Industrielle Kommunikation: Basistechnologie für die Digitalisierung der Industrie. Beuth: Berlin, Germany, 2017).

A third example pertains to the operators/owners of high-quality transport containers – when pooled or in their own logistics. Here, the use of the containers can be tracked more precisely by means of a suitable communication architecture; on the one hand, to more optimally coordinate the own services (e.g., cleaning), and on the other hand, to establish a payment model that also automatically incorporates the usage duration.



Simplified representation of a network reference architecture in a digital company.

To this end, it may be useful to set up small, self-sufficient installations at the logistics partners, suppliers and customers; on an experimental basis, this can initially represent only a few selected key partners in the value chain.

By linking new and proven technologies and architectures, strategic competitive advantages can be gained.

Industrial communication plays a key role, because it is the infrastructure for numerous other innovations. This does not necessarily involve a radical strategic change of course; rather many ideas allow experience to be gradually gained and market acceptance to be tested. Successful implementation examples demonstrate how companies have succeeded in digitally supplementing their business models.



For high-quality transport containers, new service and payment models can be established thanks to industrial communication networks.

Security information

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept. For more information about industrial security, please visit <http://www.siemens.com/industrialsecurity>

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